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Network Centric (NETCENTRIC)Warfare (NCW):

A LOGCENTRIC Perspective

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A paper submitted to the Faculty of the Naval War College in partial satisfaction of the requirement of the Department of Joint Military Operations.

The contents of this paper reflect my own personal views and are not necessarily endorsed by the Naval War College or the Department of the Navy.

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As the concept of Network Centric (NETCENTRIC) Warfare (NCW) evolves to produce what many experts and military professionals view as a Revolution in Military Affairs (RMA), it would be both wise and prudent for the U.S. military to consider a simultaneous Logistics Centric (LOGCENTRIC) approach to better harness our efforts for near-term gain and prepare for long-term benefit. This may affect a boost in combat power immediately and, more importantly, allow us to form a responsive logistics architecture relevant to a giant leap into NCW, Joint Vision 2010/20, and a RMA we can control and use to our advantage. NCW and the RMA it suggests will be ineffective if we let enthusiasm for its potential outdistance our capability to support its inception and diminish the combat power it was intended to increase. We must use the current inter-conflict period to build a forward-looking logistics architecture that nurtures NCW to make its promise of increased combat power a reality. If one has a concept but lacks precise requirements, one is best served by building capability to determine the endstate, not vice versa. A LOGCENTRIC approach to NETCENTRIC warfare supports this theory. Only with a LOGCENTRIC approach to NCW can we meter this concept to life in a positive manner. Thus, a LOGCENTRIC approach to NETCENTRIC warfare is a more prudent way to ensure a smooth road ahead as we evolve in the 21st century.

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INTRODUCTION

As the concept of Network Centric (NETCENTRIC) Warfare (NCW) evolves to produce what many experts and military professionals view as a Revolution in Military Affairs (RMA), it would be both wise and prudent for the U.S. military to consider a simultaneous Logistics Centric (LOGCENTRIC) approach to better harness our efforts for near-term gain and prepare for long-term benefit. As the intricacies and unknowns of NCW are fleshed out to shape what is widely accepted as the "coming RMA," the value-added in a LOGCENTRIC approach is not simply more means to deliver precision guided missiles, but better capability to conduct precision logistics on the battlefield. This may affect a boost in combat power immediately and, more importantly, allow us to form a responsive logistics architecture relevant to a giant leap into NCW, Joint Vision 2010/20, and a RMA we can control and use to our advantage. We must be able to guide the coming RMA in the direction we know is best for us, not let it drive us in directions we cannot control and might lead indirectly to our demise. Through much of NCW literature regarding NCW, the common thread is its capability to produce increased combat power. It is well documented in military history that logistics gives punch to military combat power. NCW and the RMA it suggests will be ineffective if we let enthusiasm for its potential outdistance our capability to support its inception and diminish the combat power it was intended to increase. Only with a LOGCENTRIC approach to NCW can we meter this concept to life in a positive manner. NCW will need logistics to establish its own framework for execution in order to have a chance for success.

The concept of NCW, if brought to fruition, will produce near-term benefits that enhance logistics, and in the long-term will pave the way to solving the challenges of focused logistics. In both instances we gain the benefit of improving the logistics activities required to sustain combat power during peace and war. For this reason, I submit the most prudent course of action is to prove the value-added of NCW by enhancing our joint operational logistics support structure and capabilities, rather than trying to place immediate emphasis on warfighting skills and targeting.

The concept and tenets of NCW seem best suited to produce value-added results in the logistics arena before the warfighting arena. In the latter, contentious issues of targeting, command and control, fear of Nintendo warfare (human vs. machine), doctrinal conflicts, and increasing high level leader involvement in routine combat missions make it more difficult to prove the value-added of using NCW to enhance combat power. Whereas, if emphasis is placed on using NCW to empower and fuse logistics functions and systems, this will markedly improve force sustainment. It will also further define and develop the operational capabilities envisioned in focused logistics. If successful, this creates a win-win situation for our military because we would experience the near term benefit of improved joint operational logistics support across the spectrum, while also laying the foundation to better prepare for the road ahead as the warfighter begins to develop NCW capabilities to their fullest extent. It seems logical, if the operational logistics support structure can function efficiently and support a transition to NCW in all facets of warfighting, that the concept is most likely to succeed and produce the increased levels of combat power intended. With a LOGCENTRIC approach, the benefits of

improved, sustained combat power in a NETCENTRIC environment should flourish, both in the near and not so near future.

This paper examines how NCW can increase the power of joint operational logistics by cross walking its implications with the principles of logistics and the challenges of focused logistics. It appears that the most prudent course of action for implementing this "evolution to a revolution in military affairs" resides in a LOGCENTRIC approach. Sufficient evidence suggests that the fundamental principles and tenets of NCW are most viable and least contentious when applied to empower our joint operational logistics architecture for enhanced combat power on the battlefield, instead of improving targeting or other forms of combat engagement with the enemy. Discussions of NCW issues concerning targeting, command and control, and cross-fertilization of Service combat power produce varying viewpoints on warfare and how we fight. This makes the whole concept of NCW quite contentious within the joint warfighting community and creates a tense atmosphere in which there is a hesitancy to accept change. Such an environment tends to slow progress, create poor implementation processes, and foster poor decisions as we try to make NCW a reality. Whereas in the logistics community, the potential value of NCW is less threatening and offers much room for testing, experimentation, and advancement. The key is, with a LOGCENTRIC approach you can achieve success on both ends of the "NCW to RMA" spectrum. The difference is, by focusing on "logistics applications first" to make NCW a viable RMA, you can gain instant and continual improvements in combat power for the joint warfighter throughout the entire evolution process, not just at the end. The common practice is to adopt technology to fit the warfighter first, and force the logistics warrior to

play catch up. This practice degrades the sustained combat power the technology was designed to produce. With logistics as the lever, a balanced approach into the NCW age can be achieved and joint lethality across the spectrum will become a supportable reality.

HISTORICAL RELEVANCE

The importance of logistics in combat and warfare is well documented from Alexander the Great (viewed by some as the first logistician) to present day. FM-100-5, Operations, notes "Logistics cannot win a war, but its absence or inadequacy can cause defeat."[1] Since technology is driving us towards NCW and an RMA, there is utility in looking at RMAs of the past and understanding the impact of logistics on their process of evolution. Professor Thomas G. Mahnken, in a lecture given at the Naval War College on 21 September 2000, stated, "An RMA occurs when the incorporation of new technologies into military systems combines with innovative operational concepts and organizational adaptations to fundamentally alter the conduct of military operations." [2] He went on to state some implications of an RMA. Two in particular highlight the importance of a LOGCENTRIC approach to NCW, are: "(1) Technology alone is insufficient to produce an RMA. How that technology is used is even more important, (2) Early leaders in exploiting new capabilities don't always sustain their lead."[3] The point here is that to use technology to gain advantage, one needs logistics to achieve combat power and to sustain the RMA advantage over an adversary as he attempts to raise the bar to your level. Another interesting point in "thinking about RMAs" is raised by Williamson Murray in a Joint Force Quarterly (JFQ) article of the same title. He states, "given the enthusiasm for describing the coming RMA as technological, the

historical record suggests that technological change represents a relatively small part of the equation".[4] He further states, "that military history over the last eighty years offers many cases in which forces with inferior technology have won conflicts. The record further suggests that the crucial element in most RMAs is conceptual in nature." [5] This insinuates that a LOGCENTRIC approach to NETCENTRIC warfare is necessary to bring its inherent RMA concept to life. Giving credence to the point, a concept becomes a tangible operational reality when it has a viable, responsive logistics architecture to support it.

We must use the current inter-conflict period to build a forward-looking logistics architecture that nurtures NCW to make its promise of increased combat power a reality. There are many interesting aspects of RMAs, but one thing is certain -- most take considerable time to develop even in wartime; and peacetime RMAs even in the 20th century have taken decades.[6] There is no reason to believe NCW and the coming RMA will be any different. Michael Howard has compared the military in peacetime to a surgeon preparing for a series of operations at an unknown time and placed under unidentified conditions without the benefit of having previously worked on live patients.[7] This statement contains a hint of how best to prepare for NCW and the RMA it implies. If one has a concept but lacks precise requirements, one is best served by building capability to determine the endstate, not vice versa. A LOGCENTRIC approach to NETCENTRIC warfare supports this theory.

Howard takes this point a step further stating, "if we leap too fast into the future to base doctrine, force structure, and employment of concepts entirely on theoretical conceptions of what war should look like,"[8] the outcome could prove detrimental.

Examples of this would be: blitzkrieg, incorporating railroad technology, and transforming from "horses to trucks", just to name a few. In each case, the concept or technological advancement delivered a new capability to the battlefield, but when employed too quickly rendered its usefulness less than effective. In many cases, the main reason for failure was inappropriate logistics architecture to support its intent and bring its intended value to fruition. The concept of blitzkrieg increased the tempo of battle and, in doing so, put immediate emphasis and strain on logistics capabilities to support this type of warfare. By implementing this concept without a LOGCENTRIC approach, there were times where advantage was achieved but progress diminished because the logistics tail could not keep up. Another good example involved German Field Marshall Rommel's troops in North Africa. "Rommel's downfall occurred not only because of the lack of supplies transported across the sea, but also because these supplies could not be moved fast enough across land to keep up with his advances."[9]

In the case of railroads Jeffrey A. Hughes cites the following example:

By the middle of the 19th century, rail transportation had revolutionized logistics in Europe. However, the military continued to rely on horse-drawn wagons to transport supplies from the railhead to the battlefield. Thus, rails benefited armies at the onset of campaigns but were of limited use for resupplying them. Once the armies moved away from the railheads, they would outpace the horse-drawn wagons that were bringing supplies to them.[10]

Another example of an "RMA/technological mismatch with logistic capability" as stated by Hughes, is as follows:

While progress was being made in transportation technology, advances also were occurring in weapon systems, some of which generated new problems. New automatic weapons used massive amounts of ammunition, and tracked vehicles required continual resupply of fuel and repair parts. These developments pushed supply trucks to their limits. It also was terribly expensive to transition an entire army from horses to trucks. The European States could not produce enough trucks to supply their armies. Even as late as 1914, the German, French, and Russian Armies depended on horses for supply

from the rear, which, because it was so slow, contributed to the German failures in WWI.[11]

The key take-away from these examples is that in each instance, if a LOGCENTRIC approach to the RMA/technological advance had been used, its execution would have produced immediately sustained benefit on the battlefield. Instead, an "RMA to logistics mismatch" occurred and fostered both flawed strategy for implementation and loss of combat power. As Murray states in his article Thinking about RMAs, "Those military organizations that have created successful RMAs have tied development of the revolutions to a realistic understanding of the past."[12] In other words, if we apply the lessons of the past, evidence suggests it is prudent to take a LOGCENTRIC approach to a NETCENTRIC driven RMA. In doing so, we can use NETCENTRIC capabilities to build precise/focused logistics architecture, achieving improved combat power immediately. This also better enables the precise targeting and munitions deliverables we see NCW providing us in the future. By avoiding a "RMA to LOGISTICS mismatch," we can use the technological basis of NCW to enhance logistics capability and bring it to the level it is expected to operate in at a NCW tempo. Thus, if we focus the technological tools of NCW on improving logistics to support NCW employment tenets, we can as Murray states; "connect technology to a clear understanding of the past and present, (and) we can perhaps push our current capabilities into the future in an intelligent fashion and thus be on the leading edge of the next RMA."[13]

To avoid the "RMA to LOGISTICS mismatch," we should focus our attention on using the strengths inherent in NCW to enhance our logistics support of the warfighter, rather than concentrating solely on engaging enemy targets and synchronizing those efforts. As stated previously, these issues are contentious and too amorphous at this

point. To continue in this mode would only slow progress or create unsupportable concepts for conducting war. By adopting a LOGCENTRIC approach to NCW we can effectively build the foundation to bring the NCW RMA to life, while simultaneously reaping immediate upgrades in combat power for current forces. This metered approach to installing NCW mechanisms produces not only near and long term value added, but also instills confidence in the NCW concept before it is used to direct and employ instruments of war (aircraft, tanks, artillery, ships, etc) in the battlespace. More importantly, this ensures logistics architecture is firmly in place to embrace this new method of warfare.

LOGCENTRICITY AND LOGISTICS PRINCIPLES

The concept and tenets of NETCENTRIC Warfare are tailor-made to a LOGCENTRIC approach as evidenced by its potential for better adhering to the *Principles of Logistics*. The most important parts of NCW are information superiority, shared awareness, adaptability, speed of command, and self-synchronization, which combine to secure access so an adversary's intentions can be thwarted or locked out.[14] Information superiority is about shared situational awareness; shared awareness is about having a common operating picture (COP); adaptability is about power and flexibility to change plans rapidly and CONOPS to fit certain environments and situations; speed of command is the process by which a superior information position is turned into competitive advantage, and self synchronization is what facilitates the speed of command process.[15] Each of these inherent traits correlates nicely to the *Principles of Logistics*. To demonstrate, lets take the anticipated benefits of NCW as given, and then examine the implications of these capabilities in applying the principles of logistics at the operational

level of warfare – that level of war which "...links the tactical employment of forces to strategic objectives." [16] As set forth in Joint Pub 4.0, the seven principles of logistics are: responsiveness, simplicity, flexibility, economy, attainability, sustainability, and survivability.

First, RESPONSIVENESS. *Joint Pub 4.0 defines responsiveness to be the right support in the right quantity in the right place at the right time. Among the logistic principles, responsiveness is the keystone; all else becomes irrelevant if the logistic system cannot support the concept of operations of the supported commander.*[17] Many tenets associated with NCW are derived from their proven applications in Big Business. By having access to data from across the spectrum in an environment or organization, you have the ability to see the battlefield (common relative operating picture, CROP) and can make swift, responsive decisions to impact immediately on a situation. This is especially important in the logistics arena. In today's military, which has downsized in structure and increased in missions, the requirement is for our force packages to be deployable, dynamic, lean, lethal, and quick to respond to any type of crisis. To achieve this mobility and lethality, emphasis is placed on staying light and operating with a reduced footprint ashore. The components of NCW are beneficial for allowing logisticians to fulfill the responsiveness principle. By operating with a common picture, the logistician is empowered to see activities on the battlefield and can meter support or sustainment requirements as need arises, instead of stockpiling and creating cumbersome, slow logistics trains. The days of Desert Storm and large logistics bases are now a rarity. Instead, the CROP promotes prompt speed of support with a purpose, and less of a logistics footprint. Also, the logistician can "see" activities on the battlefield and use

self-synchronization to reorganize or tailor his logistic flow/forces to meet the needs of the commander, thus diminishing the need for an operational pause. As Vice Admiral Arthur Cebrowski states, "in NCW operational pauses will be rare...this brings into view the value of synchronization in the battlespace---the ability to focus resources and activities in time and space to produce maximum relative combat power at the decisive point."[18] This is the essence of responsiveness and NCW, and with a LOGCENTRIC approach we can begin testing the process immediately.

SIMPLICITY is another principle of logistics supported by NCW. *Joint Pub 4.0 says simplicity reflects the need to reduce complexity and often fosters efficiency in both the planning and execution of national and theater logistic operations. Mission type orders and standardized, interoperable procedures contribute to simplicity. Establishment of priorities and pre-allocation of supplies and services by the supported unit may simplify logistic support operations.*[19] It is easy to see how this principle could be enhanced by NCW. NCW is about connectivity, networking, synergy, and empowering soldiers to interact at all levels of execution. When planning operations of joint force magnitude, the ability to connect and interact among key players is essential to good planning. NCW provides access to pertinent data in order to formulate good plans, and also facilitates interchange among those in the network to work out the details and timing of key events. We have already seen periphery technology in place today, which allows us to interact in this fashion. Email and video teleconferencing (VTC) immediately come to mind. As logisticians, this capability allows us to be engaged in the planning and execution process from the beginning, and to stay on the same azimuth for commander's intent and mission accomplishment. A logistician must advise the

commander on whether his plans are supportable. The components of NCW not only facilitate this, they also allow the logistician to engage in the process at the same tempo as the warfighter.

The next principle is FLEXIBILITY. *Joint Pub 4.0 describes flexibility as the ability to adapt logistic structures and procedures to changing situations, missions, and concept of operation.*[20] Since NCW is about increasing the tempo of warfare the need to remain flexible is critical. As NCW enables "a shift from attrition-style warfare to a much faster and more effective warfighting style characterized by new concepts of speed of command and self-synchronization,"[21] the logistics community can use these traits to its advantage. Logistics forces on the ground could be empowered to organize from the bottom up (self synchronize) in reaction to activities taking place in the CROP and increase the combat power of the forces they support. Well-designed and operated networks tend to be models of flexibility and adaptability,[22] and logisticians can take immediate advantage of these qualities to enhance combat power. For the purposes of this paper, it should be easier for the logistician to adapt these traits into their systems for testing and immediate value, rather than trying to make the concept feasible within the joint warfighting community.

Next is ECONOMY. *Joint Pub 4.0 says logistic economy is achieved when effective support is provided using the fewest resources at the least cost, and within acceptable levels of risk.*[23] Connectivity in a fast paced network can only subscribe to this principle. In fact, the logistician's ability to access resources from across the spectrum of the battlespace, be it amongst the logistics forces directly engaged, host nation support, multi-national forces, or from logistics infrastructure outside the

battlespace (i.e., the civilian economy), it is all made easier in a netcentric environment. Operating "netcentrically" allows one to tap in and maximize the resources at one's immediate disposal, or outsource when necessary to get the "product to requirement to task" match. With the components of NCW at his disposal, the logistician has the enhanced ability to see the battlespace; and coordination of the efforts of individual units and platforms could allow a competent logistician, by a superior understanding of battlespace conditions, to employ resources more adroitly to accomplish a particular mission – NCW should thus allow a better distribution of resources to tasks than was possible in the past.[24]

The next two *Principles of Logistics*, ATTAINABILITY and SUSTAINABILITY, mesh together nicely. In essence, one is about attaining supplies and services to commence combat operations, while the other is about long term support for the duration of an operation. *Joint Pub 4.0 describes both as follows. ATTAINABILITY (or adequacy) is the ability to provide the minimum essential supplies and services required to begin combat operations. SUSTAINABILITY is a measure of the ability to maintain logistic support to all users throughout the theater for the duration of the operation.*[25] As Joint Pub 4.0 states, of the two, long-term support is the greatest challenge for the logistician, who must not only attain the minimum essential materiel levels to initiate combat operations (readiness), but must also sustain those operations.[26] The components of NCW can assist in this regard. For starters, the ability of the logistician to interact with multiple support units and outside agencies in preparation for an operation can serve to expedite and pinpoint the necessary commodities for the warfighter, based on the plan, concept of operations, and environment in which the

operation will occur. The key element NCW affords to facilitate this process is access. Through access, the logistician can effectively tailor and orchestrate his support to meet the needs of the warfighter. This can be a benefit in peacetime as well as war. This capability translates well into long-term sustainment requirements. If the logistician has access to a CROP on the ground, this empowers him to see events, visualize the road ahead, and meter sustainment stocks to support optempo on the ground, thus keeping the logistics footprint small and dynamic.

The final principle of logistics is SURVIVABILITY. *Joint Pub 4.0 states that survivability is the capacity of the organization to prevail in the face of potential destruction.*[27] For logisticians, survivability involves protecting Lines of Communication (LOCs), logistics units themselves, bases, airports, seaports, etc. All these nodes feed the arteries that sustain the warfighter and his combat power. In a netcentric environment, the warfighter would be better able to see activities in these areas and could allocate specific forces, or designate defensive capability, to facilitate protection of these vital logistic targets. In most instances the ability to sustain combat operations is considered a center of gravity at the operational and theater strategic level. By operating "netcentrically," the logistician can view the battlefield and spot potential danger flashpoints in his area of responsibility. Additionally, he can advise the warfighter directly on the status of resupply nodes. If bottlenecks occur in these areas, corrective action can be taken immediately to fix the situation and maintain a steady flow of forces and equipment along certain routes. The units involved in protecting logistics forces and nodes also have visibility of movement and activity at various locations, and can alter

force protection requirements accordingly to ensure safety and avoid degradation of combat power.

CONCLUSION

As we have see, NCW and its components translate nicely into the logistics community; and if focused on enhancing logistics first, greater advancement towards proof of the concept, plus its near and long term inception, can be achieved. By adopting a LOGCENTRIC approach as the NCW concept evolves, the warfighter and joint warfighting community can immediately enhance combat power of military forces today and continue to meet the challenges of Joint Visions (JV) 2010 and 2020. As Joint Pub 4.0 states *JV 2010 and 2020 encompass four operational concepts: dominant maneuver, precision engagement, full dimensional protection, focused logistics, and the enabling concepts of information superiority and technological innovation (ie; NCW). Each will contribute to full spectrum dominance and fortunately, while the contribution of logistics has been widely recognized throughout US history, this is the first time logistics has been formally designated a full partner in the joint warfighting process.*[28] We should build on this concept. By applying information superiority and technological innovation to improving focused logistics, in essence we better achieve and build a foundation of combat power to support the other three operational concepts of JV 2010/20. Specifically, "the challenges of focused logistics represent the grouping of similar logistics functions and systems to define desired operational capabilities for the 2020 force. These are: joint deployment and rapid distribution, information fusion, multinational logistics, agile infrastructure, and joint theater logistics".[29] In every instance, the process for improvement in each of these areas entails better management,

visibility of equipment, supplies, forces, databases to facilitate accessibility of enroute infrastructure to support reception, staging, onward movement, and integration (RSOI) requirements, force projection, force tracking, reducing logistics footprints, velocity management, leveraging outsourcing, and minimizing stovepipe data systems. This is a mouthful, but the bottom line is that by adapting the components of NCW in a LOGCENTRIC manner, we could better posture the military to meet focused logistics challenges. In doing so, our efforts are then aimed properly to support the joint warfighter as he begins to adapt how he fights to NETCENTRIC principles. Of greatest importance, the challenges of information fusion and agile infrastructure are best solved as the components of NCW are brought to fruition. At Army LOG Summit 2000, General Shinseki said it best in talking about the impact of logistics as we begin to embrace future concepts such as NCW:

> The transformation of the force that is at the heart of the Army vision is fundamentally a logistics process. This is because achieving the agility that will be required by the transformed Army will depend greatly on creating an agile logistics structure. Therefore, "Agility in our logistics structure makes force agility".[30]

Though General Shinseki refers to Army transformation, the philosophy is applicable to the joint world as well, especially when one considers all Services are moving to embrace NCW. To further drive this point home, reference the criticality of logistics agility and its relation to combat power, General Shinseki goes on to say:

> I compare the Army to a rattlesnake. A rattlesnake is always lethal, but his ability to strike and inflict damage on his target depends on his posture. If he is coiled, he has maximum spring and thus striking power. But if he is stretched out, there is no striking power behind his still deadly fangs; he has lost his ability to project his lethality. Similarly, when the Army's support structure is stretched out, the Army remains lethal but loses striking power. But when that support structure is compact ("coiled"), the Army attains maximum ability to bring its combat power to bear on its chosen target.[31]

This analogy applies to any Service and does an excellent job of highlighting the need for a LOGCENTRIC approach as we embrace the concept and components of NCW. Basically, this analogy should serve as a warning or lesson re-learned for all Services. We should not continue to place emphasis solely at the "tip of the spear" as the proper means for implementing NCW into wartime usefulness, nor engaging targets as NCW's primary value and contribution to combat power. If we careen down this course, our enthusiasm for near term results will evaporate quickly as an "RMA to LOGISTICS mismatch" surfaces to reduce the combat power anticipated. Essentially, we replay the unfortunate familiar scenario wherein the warfighter is prepared to execute his end of the RMA, yet in the midst of execution, the warfighter, while operating at the "tip of the spear" quickly outdistances his logistics capability and structure. He arrives at the point of engagement with capability for immediate gratification, but without the sustained combat power necessary to make a difference in a "more than one salvo" conflict. With a LOGCENTRIC approach to embracing NCW as the coming RMA, we can avoid this mismatch and achieve increased combat power, with true staying power for present and future effectiveness in the battlespace.

Current threats and lack of a peer competitor on the battlefield do not necessitate an urgent push to make NCW work in the warfighting arena (at the "tip of the spear"). We have time, to review history and to choose wisely. If the aim of NCW is enhanced combat power on the battlefield, the heart of this requirement rests in our joint operational logistics capabilities, functions, and structures. Rather than push a contentious issue (fighting the netcentric battle) on the warfighter and slow our forward progress, a more prudent approach is to build the capability in our logistics architecture

and thereby prove its' value-added to the warfighter. By leveraging this capability within our joint operational logistics framework, we can empower and develop our logistics forces, systems, and functions to achieve increased combat power on the battlefield. More importantly, if the joint operational logistics architecture is synchronized with netcentric tempo, when the warfighter is ready to embrace these capabilities, the logistics forces will be better prepared to support the transition, rather then playing catch up. Thus, a LOGCENTRIC approach to NETCENTRIC warfare is a more prudent way to ensure a smooth road ahead as we evolve in the 21st century.

ENDNOTES:

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[16] Joint Chiefs of Staff, Doctrine for Joint Operations, Joint Pub 3.0 (Washington DC: 7 February 1996), II-8; with linkage to Joseph W. Caneva "Network Centric Warfare: Implications for Applying the Principles of War," Unpublished NWC Student paper, 1999: 1.

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[21] Arthur K. Cebrowski and John J. Garska, "Network Centric Warfare: Its Origin and Future," Proceedings, January 1998: 32.

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[25] Joint Chiefs of Staff, Doctrine for Logistics Support to Joint Operations, Joint Pub 4.0 (Washington DC: 27 January 1995), II-2-3.

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[27] Ibid.

[28] Ibid, D-1.

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